FIG. 1A

```
cagaaagaga cctatatgat caaatacaga ac atg atc ttc ctc ctg cta atg   53
                                    Met Ile Phe Leu Leu Leu Met
                                      1               5

ttg agc ctg gaa ttg cag ctt cac cag ata gca gct tta ttc aca gtg   101
Leu Ser Leu Glu Leu Gln Leu His Gln Ile Ala Ala Leu Phe Thr Val
         10                  15                  20

aca gtc cct aag gaa ctg tac ata ata gag cat ggc agc aat gtg acc   149
Thr Val Pro Lys Glu Leu Tyr Ile Ile Glu His Gly Ser Asn Val Thr
     25                  30                  35

ctg gaa tgc aac ttt gac act gga agt cat gtg aac ctt gga gca ata   197
Leu Glu Cys Asn Phe Asp Thr Gly Ser His Val Asn Leu Gly Ala Ile
 40                  45                  50                  55

aca gcc agt ttg caa aag gtg gaa aat gat aca tcc cca cac cgt gaa   245
Thr Ala Ser Leu Gln Lys Val Glu Asn Asp Thr Ser Pro His Arg Glu
                 60                  65                  70

aga gcc act ttg ctg gag gag cag ctg ccc cta ggg aag gcc tcg ttc   293
Arg Ala Thr Leu Leu Glu Glu Gln Leu Pro Leu Gly Lys Ala Ser Phe
             75                  80                  85

cac ata cct caa gtc caa gtg agg gac gaa gga cag tac caa tgc ata   341
His Ile Pro Gln Val Gln Val Arg Asp Glu Gly Gln Tyr Gln Cys Ile
         90                  95                 100

atc atc tat ggg gtc gcc tgg gac tac aag tac ctg act ctg aaa gtc   389
Ile Ile Tyr Gly Val Ala Trp Asp Tyr Lys Tyr Leu Thr Leu Lys Val
    105                 110                 115

aaa gct tcc tac agg aaa ata aac act cac atc cta aag gtt cca gaa   437
Lys Ala Ser Tyr Arg Lys Ile Asn Thr His Ile Leu Lys Val Pro Glu
120                 125                 130                 135

aca gat gag gta gag ctc acc tgc cag gct aca ggt tat cct ctg gca   485
Thr Asp Glu Val Glu Leu Thr Cys Gln Ala Thr Gly Tyr Pro Leu Ala
                140                 145                 150

gaa gta tcc tgg cca aac gtc agc gtt cct gcc aac acc agc cac tcc   533
Glu Val Ser Trp Pro Asn Val Ser Val Pro Ala Asn Thr Ser His Ser
            155                 160                 165

agg acc cct gaa ggc ctc tac cag gtc acc agt gtt ctg cgc cta aag   581
Arg Thr Pro Glu Gly Leu Tyr Gln Val Thr Ser Val Leu Arg Leu Lys
        170                 175                 180

cca ccc cct ggc aga aac ttc agc tgt gtg ttc tgg aat act cac gtg   629
Pro Pro Pro Gly Arg Asn Phe Ser Cys Val Phe Trp Asn Thr His Val
    185                 190                 195
```

FIG. 1B

```
agg gaa ctt act ttg gcc agc att gac ctt caa agt cag atg gaa ccc    677
Arg Glu Leu Thr Leu Ala Ser Ile Asp Leu Gln Ser Gln Met Glu Pro
200                 205                 210                 215

agg acc cat cca act tgg ctg ctt cac att ttc atc ccc tcc tgc atc    725
Arg Thr His Pro Thr Trp Leu Leu His Ile Phe Ile Pro Ser Cys Ile
                220                 225                 230

att gct ttc att ttc ata gcc aca gtg ata gcc cta aga aaa caa ctc    773
Ile Ala Phe Ile Phe Ile Ala Thr Val Ile Ala Leu Arg Lys Gln Leu
            235                 240                 245

tgt caa aag ctg tat tct tca aaa gac aca aca aaa aga cct gtc acc    821
Cys Gln Lys Leu Tyr Ser Ser Lys Asp Thr Thr Lys Arg Pro Val Thr
        250                 255                 260

aca aca aag agg gaa gtg aac agt gct atc tga acctgtggtc ttgggagcca 874
Thr Thr Lys Arg Glu Val Asn Ser Ala Ile
    265                 270

gggtgacctg atatgacatc taaagaagct tctggactct gaacaagaat tcggtggcct 934

gcagagcttg ccatttgcac ttttcaaatg cctttggatg acccagcact ttaatctgaa 994

acctgcaaca agactagcca acacctggcc atgaaacttg ccccttcact gatctggact 1054

cacctctgga gcctatggct ttaagcaagc actactgcac tttacagaat taccccactg 1114

gatcctggac ccacagaatt ccttcaggat ccttcttgct gccagactga aagcaaaagg 1174

aattatttcc cctcaagttt tctaagtgat ttcca                            1209
```

FIG. 2A

```
                    *        20         *        40         *        60         *        80         *
Cd80_Human  :   MGHTRRQGTSPSKCPYLNFFQLLVLAG.LSH.FC.SGV...IHVTKE....VKEVATLSC....GHNVSVEELAQTRIYWQKEKKMVLT. :  75
Cd86_Human  :                       MGLSNILFVMAFLLSGAAPLKIQ.....AYFNETADLPCQFANSQNQSLSELV...VFWQDQENLVLN. :  60
GA16817596  :               MIF..LLLMLSLELQLHQ.IAALFTVTVPKELYII.....EHGSNVT.LECNFDTGSHVNLGAIT...ASLQK........ :  61
B7-H1_Huma  :               MRIFAVFIFM...TYWHL.LNA.FTVTVPDKLYVV.....EYGSNMT.IECKFPVEKQLDLAAL...IVYWEMEDKNII.Q :  66
B7rp-1_Hum  :           MRLGSPG...............LLFLLFSSLRADTQEKEVR.....AMVGSDVELSCACPEGSRFDLNDV...YVYWQTSESKTV.. :  62
Pro352_Hum  :          MLRRRGSPGMGVHVGAALGALWFC.LTGALEVQVPEDPVV.....ALVGTDATLCCSFSPEPGFSLAQL...NLIWQLTDTK...Q :  74
Btf1_Human  : MESAAALHFSRPAS....LLLLLLSLCAL.VSAQFIVVGPTDPIL.....ATVGENTTLRCHLSPEK..NAEDM...EVRWFRSQFS...P :  73
Btsf2a2_Hu  : MEPAAALHFSLPASLLLLLLLLLSLCAL.VSAQFTVVGPANPIL.....AMVGENTTLRCHLSPEK..NAEDM...EVRWFRSQFS...P :  77
Btf4_Human  :                 FHVSLLLVQLLTPC....SAQFSVLGPSGPIL.....AMVGEDADLPCHLFPTM..SAETM...ELKWVSSSLR...Q :  61
Btn3a3_Hum  : ....MKMASSLAFLLLNFHVSLFLVQLLTPCSAQFSVLGPSGPIL.....AMVGEDADLPCHLFPTM..SAETM...ELRWVSSSLR...Q :  74
Btn_Human   : ....MAVFPSSGLPRCLLTLILLQLPKLDSAPFDVIGPPEPIL.....AVVGEDAELPCRLSPNA..SAEHL...ELRWFRKKVS...P :  72

                   100         *       120         *       140         *       160         *       180
Cd80_Human  : .MMS...GDM...NIWPEYKNRT...IFD..ITNNLSIVILALRPSDEGTYECVVLKYEKDAFKREHLAEVTLSVKADFPTPSISDFEIPTS : 155
Cd86_Human  : EVYL...GKEKFDSVHSKYMGRT...SFD...SDSWTLRLHNLQIKDKGLYQCIIHHKKPTGMIRIHQMNSELSVLANFSQPEI....V.PI : 138
GA16817596  : .VENDT..........SPHRERATLLE.EQLPLGKASFHIPQVQVRDEGQYQCIIIY....GVA.WDYKYLTLKVKASY..RKINTHILKVP : 134
B7-H1_Huma  : FVH....GEEDLKVQHSSYRQRARLLK.DQLSLGNAALQITDVKLQDAGVYRCMISY....GGADY..KRITVKVNA....PYNKINQRILV : 143
B7rp-1_Hum  : .VTYHIPQNSSLENVDSRYRNRALMS.PAGMLRGDFSLRLFNVTPQDEQKFHCLVLSQSL.GFQEVLSVEVTLHVAANFSVPVV...S.APH : 147
Pro352_Hum  : LVHSFAEG....QDQGSAYANRTALFP.DLLAQGNASLRLQRVRVADEGSFTCFVSIRDF.G.....SAAVSLQVAAPYSKPSM...TLEPN : 152
Btf1_Human  : AVFVYKGGRERTEEQMEEYRGRTTFVSKD.ISRGSVALVIHNITAQENGTYRCYF..QE..GRS.YDEAILHLVVAGLGSKPLISM...... : 153
Btsf2a2_Hu  : AVFVYKGGRERTEEQMEEYRGRITFVSKD.INRGSVALVIHNVTAQENGIYRCYF..QE..GRS.YDEAILRLVVAGLGSKPLIEI...... : 157
Btf4_Human  : VVNVYADGKEVEDRQSAPYRGRTSILR.DGITAGKAALRIHNVTASDSGKYLCYF..QD..GDF.YEKALVELKVAALGSNLHVEV...... : 141
Btn3a3_Hum  : VVNVYADGKEVEDRQSAPYRGRTSILR.DGITAGKAALRIHNVTASDSGKYLCYF..QD..GDF.YEKALVELKVAALGSDLHIEV...... : 154
Btn_Human   : AVLVHRDGREQEAEQMPEYRGRATLVQ.DGIAKGRVALRIRGVRVSDDGEYTCFFR.ED..GS..YEEALVHLKVAALGSDPHISM...... : 152

                         *       200         *       220         *       240         *       260         *
Cd80_Human  : NIR......RIICSTSGGFPEP.HLSWLENGEELNAINTTV...........SQDPETELYAVSSKLDF...NMTTNHSFMCLIKY..GHLR : 224
Cd86_Human  : SNITENVYINLTCSSIHGYPEPKKMSVL........LRTKNSTIEYDGIMQKSQDNVTELYDVSISLSVSFPDVTSNMTIFCILET...DKT : 219
GA16817596  : ET....DEVELTCQAT.GYPLAE.VSWPN....VSVPANTSHSR..........TP.EGLYQVTSVLRLKP...PPGRNFSCVF....WNTH : 198
B7-H1_Huma  : VDPVT.SEHELTCQA.EGYPKAE.VIWTSSDHQVLSGKTTTTNSK..........REEKLFNVTSTLRINT...TTNEIFYCTFRRLDPEEN : 219
B7rp-1_Hum  : SPSQ..DELTFTCTSINGYPRPN.VYW.........INKTDNSLLDQALQNDTVFLNMRGLYDVVSVLRIAR...TPSVNIGCCIENVLLQQN : 225
Pro352_Hum  : KDLRPGDTVTITCSSYQGYPEAE.VFWQDGQGVPLTGNVTTSQ...........MANEQGLFDVHSVLRVVL...GANGTYSCLVRNPVLQQ. : 229
Btf1_Human  : .RGHEDGGIRLECISRGWYPKPL.TVWRDP..YGGVAPAL........KEVSMP.DADGLFMVTTAVIIRD...KSVRNMSCSINNTLLGQK : 229
Btsf2a2_Hu  : .KAQEDGSIWLECISGGWYPEPL.TVWRDP..YGEVVPAL........KEVSIA.DADGLFMVTTAVIIRD...KYVRNVSCSVNNTLLGQE : 233
Btf4_Human  : .KGYEDGGIHLECRSTGWYPQPQ.IQWSNA..KGENIPAV........EAPVVA.DGVGLYEVAASVIMRG...GSGEGVSCIIRNSLLGLE : 217
Btn3a3_Hum  : .KGYEDGGIHLECRSTGWYPQPQ.IKWSDT..KGENIPAV........EAPVVA.DGVGLYAVAASVIMRG...SSGGGVSCIIRNSLLGLE : 230
Btn_Human   : .QVQENGEICLECTSVGWYPEPQ.VQWRTS..KGEKFPST........SESRNP.DEEGLFTVAASVIIRD...TSTKNVSCYIQNLLLGQE : 228
```

FIG. 2B

```
                      280         *        300         *        320         *        340         *        360
Cd80_Human  : ..VNQTFNWNTTKQEHFPDNLLPSWAITLISVNGIFVICCLTYCF........APR....C....RERRRNERL.RRESVR.PV      : 288
Cd86_Human  : RLLSSPFSIELEDPQPPPDHI..PW...ITAVLPTVIICVMVFCLILWKWKKKKRPRNSYKCGTNTMEREESEQTKKREKIHIPERSDEAQR : 306
GA16817596  : A...........RELTLASIDLQSQMEPRTHPTWLLHIFIPSCIIAFIFIATVIALRK..QLCQKLYSSKDTTKRPVTTTKREVNSAI     : 273
B7-H1_Huma  : HT..........AELVIPELPLAHPPNERTHLVILGAILL..CLGVALTFI...FRLRKGRMMDVKKCGIQDTNSKKQSDTHLEET       : 290
B7rp-1_Hum  : LTVGSQTGNDIGERDKITENPVSTGEKNAATWSILAVLCLLVVVAVAIGWVC......RDRCLQHSYAGAWAVSPETELTGHV          : 302
Pro352_Hum  : .........DAHXSVTITGQPMTFPPE..ALWVTVGLSVCLIALLVALAFVC..WRKIKQSC.EEENAGAEDQDGEGEGSKTALQPLKHSDS : 307
Btf1_Human  : KESVIFIPESFMPSV.......SPCAVALPIIV..........VIL...MIPIAVCIYWINKLQKEK                           : 276
Btsf2a2_Hu  : KETVIFIPESFMPSA.......SPWMVALAVILTASPWMVSMTVILAVFIIFMAVSICCIKKLQREKKILSGEKKVEQEEKEIAQQLQEELR : 318
Btf4_Human  : KTASISIADPFFRSA.......QPWIAALAGTLPILLLLLAGASYFLWRQQKE                                         : 263
Btn3a3_Hum  : KTASISIADPFFRSA.......QPWIAALAGTLPISLLLLAGASYFLWRQQKEKIALS..RETERERMKEMGYAATEQEISLREKLQEELK : 313
Btn_Human   : KKVEISIPASSLPRL.......TPWIVAVAVILMVLGLLTIGSIFFTWR.......LY..NERPRER..........RNEFSSKERLLEELK : 294

                  *        380         *        400         *        420         *        440         *        460
Cd80_Human  :                                                                                             : -
Cd86_Human  : VFKSSKTSSCDKSDTCF                                                                           : 323
GA16817596  :                                                                                             : -
B7-H1_Huma  :                                                                                             : -
B7rp-1_Hum  :                                                                                             : -
Pro352_Hum  : KEDDGQEIA                                                                                   : 316
Btf1_Human  :                                                                                             : -
Btsf2a2_Hu  : WRR.................TFLHAADVVLDPDTAHPELFLSEDRRSVRRGPYRQRVPDNPERFDSQPCVLGWESFASGKHYWEVEVENVM  : 392
Btf4_Human  :                                                                                             : -
Btn3a3_Hum  : WRKIQYMARGEKSLAYHEWKMALFKPADVILDPDTANAILLVSEDQRSVQRAEEPRDLPDNPERFEWRYCVLGCENFTSGRHYWEVEVGDRK : 405
Btn_Human   : WKK.................ATLHAVDVTLDPDTAHPHLFLYEDSKSVRLEDSRQKLPEKTERFDSWPCVLGRETFTSGRHYWEVEVGDRT  : 368

                          *        480         *        500         *        520         *        540         *
Cd80_Human  :                                                                                             : -
Cd86_Human  :                                                                                             : -
GA16817596  :                                                                                             : -
B7-H1_Huma  :                                                                                             : -
B7rp-1_Hum  :                                                                                             : -
Pro352_Hum  :                                                                                             : -
Btf1_Human  :                                                                                             : -
Btsf2a2_Hu  : VWTVGVCRHSVE.RKGEVLLIPQNGFWTLEMF.GNQYRALSSPERILPLKESLCRVGVFLDYEAGDVSFYNMRDRSHIYTCPRSAFTVPVRP : 482
Btf4_Human  :                                                                                             : -
Btn3a3_Hum  : EWHIGVCSKNVERKKGWVKMTPENGYWTMGLTDGNKYRALTEPRTNLKLPEPPRKVGIFLDYETGEISFYNATDGSHIYTFPHASFSEPLYP : 497
Btn_Human   : DWAIGVCRENV.MKKGFDPMTPENGFWAVELY.GNGYWALTPLRTPLPLAGPPRRVGIFLDYESGDISFYNMNDGSDIYTFSNVTFSGPLRP : 458
```

FIG. 2C

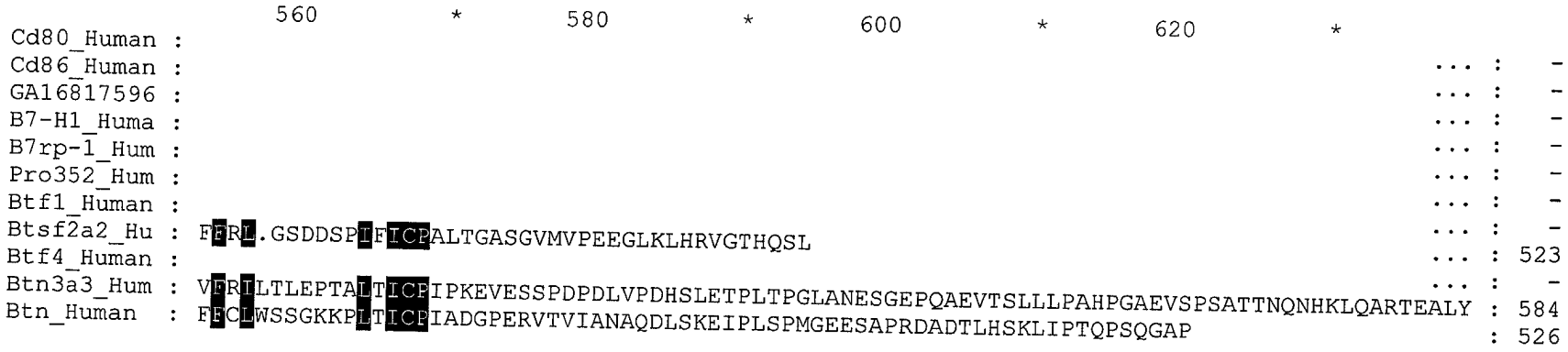

560
*
580
*
600
*
620
*
Cd80_Human :
Cd86_Human :
GA16817596 :
B7-H1_Huma :
B7rp-1_Hum :
Pro352_Hum :
Btf1_Human :
Btsf2a2_Hu : FERL.GSDDSPIFICPALTGASGVMVPEEGLKLHRVGTHQSL
Btf4_Human :
Btn3a3_Hum : VFRILTLEPTALTICPIPKEVESSPDPDLVPDHSLETPLTPGLANESGEPQAEVTSLLLPAHPGAEVSPSATTNQNHKLQARTEALY
Btn_Human : FECLWSSGKKPLTICPIADGPERVTVIANAQDLSKEIPLSPMGEESAPRDADTLHSKLIPTQPSQGAP
... : -
... : -
... : -
... : -
... : -
... : -
... : -
... : 523
... : -
: 584
: 526

FIG. 3A

ataagaagct gaattaaggt gatggcagtg gggtggaaga aaggagagcc accatgcaaa 60

aagtatccag gagggagaat taacaggact aggggatggg ccatatttgc aagatgagaa 120

atgcagaggt ctaagattct agctnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 180

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 240

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nngcataaac 300

catattttcc ccagaggagg attagtagga aaggaagctg ctggttggaa agtatcttta 360

tagcagtgtc tgttcctcgg tttgctcaag gggacagtgt gccaggaaag tccccgtgga 420

agggcaagga agaaggggaa gttaaagcca gtggcaggtg atccaagaat cttttctgtt 480

gctagagcta tgttacatgc tgtcctttca tgctctaaaa ataagagtgc tggcaagtgc 540

caggcctgtt ggtgcagctt aagatgatac ctttcttgga tatatatgca tctgaataag 600

gaaggctatc ttctggtcaa gctaaggtat gccatgagca tttccctgtg gaaagcactt 660

aattctgttc ccagttgtta cctgctgtaa gatctccctt tctaaaataa aaacaagaat 720

acagctcact gaggacctta catttccctc tagctactga ctcatttctc ttctcctttt 780

tatagcactc ttcttgagag agttgcctat atttgttgcc acatctttac ccattctctt 840

ttgaacctat tcaagctttc atctgtacaa aactcactga tactgtgctt gtcaggatca 900

tccatgacct ccatactgct aaatgcaact ctcaagagta tttggctcta ctgatcactc 960

ctttgtagca ctgtgtttta aaatataggt tttattatta tttaggtatg gtgaggccaa 1020

tatatcagga aatgactgtc gttgaaaaaa gtatgttgta ctcacagatc ccaagagaag 1080

gggggcacac catgccacaa agggccacat ggggaagcac cagggtcagc caggaggtgg 1140

gtgggggggtg cgcaagatct ttattgtggt ttcaacagga agaaatgggt gaagcagggt 1200

gagtggattt aggattagct gatataaata atttcagcag gctctggggc ataggggctg 1260

tccctagtct tctggtactt ggccctgggg tgattaaggc agttgcatag tgttgggaat 1320

gtgaaagccc ccaataaatg aggcagttgt gggtatgggc tctgaaatgg gttggtttgc 1380

atttgaaagg tgtgctcatg ggcaagtggt ttactctctc ttagaggtta gaattggcta 1440

accctgggag cggcagtccc ttcagggtca gcaaggcccc aggtgtcaaa gcatcagaat 1500

acagaaaata aaatgcatgg ataatacaca ctgccatttg cctttgtacc cttcctttca 1560

atcttctctg ctggtgaccg ctcttcacaa agatctataa atgttggaat accccatgtc 1620

FIG. 3B

tcagtccttg ggcactctct ttcctatctc tctgtaggtg atgtaatgca gatatccatg 1680

actttaaatc tttaacactt ctgcattgat gactcctaaa tttacatctc taccccaact 1740

gcctactaaa cacctccact tggctatcta ataggcattt caaaccaaat ctacaacaaa 1800

cgtaactctt tttccccttc cttaatttgc ttctccccca gccttctcca ttttaataaa 1860

cagcatctcc attgccttag tgactcaagc cccaaactta ggaattttcc cagatttccc 1920

tctttttctc aaactatata tctagcctgt cagcagttcc cttcaggtct tttttcnnnn 1980

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 2040

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 2100

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 2160

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 2220

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 2280

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 2340

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 2400

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnna 2460

ctaannnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 2520

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnngctc 2580

catttatatt tannnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 2640

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 2700

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 2760

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 2820

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 2880

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 2940

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 3000

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 3060

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 3120

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 3180

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 3240

FIG. 3C

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 3300

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 3360

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn ttgtgtttta 3420

aatatatata cacacttaga cacatataac cctctttcgt atatcaatta tactttaata 3480

aagctgttgn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnctcgcca 3540

acagaccact tctcacccct actagcccct ctactctaag ctatcagcat ttctgcaaac 3600

acattcctaa ccgatctcac tgcttgtaat cttgccagca acctctccct ctcagcaata 3660

gtctattgcc tacaccaaag cttagttgtc tcttaatgat gtaaatgagg ttctatcatt 3720

ctcctgaccc aaaccctcca ctgcttttca tcacactcag agcagctctg ctgttgcctg 3780

atttagatgt atggctccaa cagatttccc ctgaagaaat gattccatgg ctgataaaag 3840

ttggaaagcc tcctcagttt cagaccatta tcagattagc tgtgtgctct gtccctttcc 3900

tcaaccataa gaagtccatg gataaagaaa gcttcagagt aaaggagaaa gcatgggagg 3960

tacagcagga ccaaggtggg gcattcgcag cccccaccct catcagagcc agttccctac 4020

tctccctgtc taaacctctt agtaagaggt agttcaagag aggggcaaac tcaattccag 4080

cactcaaaag cacttgacta ctttgctcag tcaactagca agtatttatt gagaatgtag 4140

ctctgttcta tggagtctta ttttcaagtg tcagactccc agacatccag tccaggtaaa 4200

gaagatggtg tccattattc atttgacaaa caaagttggg gttcaagggc cagctattga 4260

aaaaagctat ggaaagcttc atgagacgtg caggtaactg ccaatatgtg tggttcacaa 4320

ggactggttc atattcagaa acggccatta gaaaaggaag aagaacttct catttggatt 4380

tataaagagt gtcttgttta ctcttaattt atatcttctc ttctccagga aatcaaccta 4440

taacttctcc tcccagctcc actctaccat ggtctgtcac cttccccaaa tgatttgtta 4500

ttcccctgtt ttcaaaagtg aacaaagaac caaagaccca gcaaagtttc acaaggccct 4560

gagactttca attgtctatt tcagatcaaa tacagaac atg atc ttc ctc ctg cta 4616
Met Ile Phe Leu Leu Leu 6

atg ttg agc ctg gaa ttg cag ctt cac cag ata gca ggtaagaaag 4662
Met Leu Ser Leu Glu Leu Gln Leu His Gln Ile Ala 18

gacaaaggga gaggcttaag aaagaagagc aggtggtggt tcctagccaa agccaaaaat 4722

gagaatgtgg ccctcaggct gagggctttc tttgagagga cgtatgattt ctgggctatt 4782

FIG. 3D

ccaagcacca caaaaaaaaa aagagtcccc atggtggctt atacatgcca atgtccctat 4842

ctgacagaaa cggtgactga gaatattgct ccatctattc ccactatcca gtgagggtaa 4902

tgacaagaag acaggatcac tcagaccatg taaatctaaa ctgatacaag agggcagggg 4962

ttgagttccc ttaaaggtga gatgccaagc agctgtcccc ttcctttctg gcagggagag 5022

taaggagaca atggccaggg aacaccgtta ctctaaagat aatgtcttga agacattctg 5082

catattatta gttgtttctg tgagtttctt ttttgaaaag caacaatagc agccgttggt 5142

cattcatacc ttaatgtggt ttactgagtc ttcctaaaac ccaaatgaac aatgaacctt 5202

aaggctatcc ctttggactt gaagaaagga cttctattgg aggatgaggg tgagcagaaa 5262

gaaaagcagt ttcacagttg gttgttctcc tggggaaggt agttcagacc attcgagggt 5322

gtagttagaa ccatgagtgc actattttgg atgaacacca ggagctaaga gagtaacata 5382

gaggtgtgga cagaggatta agtcctcaag acaatagccc cagccccatg ggaaatcatc 5442

tttctgctca tgattgagaa ataatggctc ccttggcact tgataacctt tcgaagagct 5502

ttctcctccc tactagctgg ttccagatca ctcttcaccc agtcacattc ctctcactca 5562

cttgagctgc ccagcctggt ctggcactag agacatgcac ttggggccct cctcaaagga 5622

agaccctgag atattctgct tacttctact ctgctcctgc ctgcagggcc agctaaagga 5682

acttttcatg ttttctttgc aaggaaccct gcctggctgg cattttagag acaagcaaaa 5742

ggggcaataa cttccttgct acaaaacagc ttcaagtttc catagagtga taagggaaat 5802

gagggccaaa agacactgtt ccccatcctg tggcaggact gggggcttca ggagaaaact 5862

tggggaatgt gtaacctctg tgggtttgta gcttaaaaac actgagatcc tgggttttct 5922

gtctttgttt tttgcctttt ctcttaggaa aggagtgagc tagggtgaca aggggcaaca 5982

ttttttatcc ctcattggct ctttctacag aggaaggatc ttttcttcta agataatcag 6042

cacaagacaa tgaagatagg cactagctcc cagttaggta tactaatggg gcaaaaggaa 6102

gagcatttnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 6162

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnattttgca ggtgagggaa ctagaactca 6222

gaaaaggtac ttaatttccc caagattaca tagttattag gtgacaccgg caagatttca 6282

acaaagctaa tgtcctttct actttactgt gctaccatga tgatggtaat caaaaatggc 6342

agacaaccca taaatcttcc aactttggaa taggtttttg cactgaagtc tgaatatgga 6402

FIG. 3E

tacgtattga atgtttattc tggatattca cagaatcaaa aaatatgtgt aatgaattat 6462

gttgctgaat taactgaaag gaaagtaaaa atgtagcgct ttctcatttt cttcacgaat 6522

ttggaattct tttctgcttt ccactatgca gataacatca gttcagacaa atattaaata 6582

cctacctaaa ttagaatgcc ttctcctcat gggatttttt taaaatcttg tcatttcatg 6642

tctctttaat taaagagttt tgatttcaga ggagggtacc tgcaaaagaa aacaacaaaa 6702

aaactaaagg atctgagaaa taattagtgt ttacttctgg ggaggggagg aggtctggga 6762

tgggggtaaa aaggatagtc ttatctatta tgtatattca ggtttttgtt ttttacaaga 6822

agcatgtatt aggnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnca agaaatttct 6882

catataaaaa tatgaaagta atcagactgc aacactcagt gcctgagaca gagctacagc 6942

tatcagggtg tccagacaga cagaagatta cattttcttc cttgctcctt gtacagcccc 7002

agacctgcat gcttcattga aaagaaaaga agatacctga attaaatcaa tgtgatgctt 7062

agtaccctat cagtgcacat ttcttttcnn nnnnnnnnnn nnnnnnnnnn cacttnnnnn 7122

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 7182

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 7242

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 7302

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 7362

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnca 7422

cttatggcgg tattctcagt cattacaaat aaataaaaac aatccatatg ccctggagaa 7482

tttgattcca ggagtaggtc tagaagaact tcaactggag aatggataga gaaatcatgg 7542

tatatttgca gnnnnnnnnn nnnnnnnnnn nnngatagca tgtgaataaa ttaattacaa 7602

aaacatatga ctacatctat tattatatag catgtagata aattacaaaa acatgtaact 7662

acatctatga atcttagagc ataatattga gnnnnnnnnn nnnnnnnnnn nnnnnnggcc 7722

agaagataac acatagcaca atgtcctttt cataaataaa tatattgctt aagcatacct 7782

tatatataga agataaagct taaaaagtaa agaagag 7819

FIG. 4

attatcactt atgagggtgn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 60

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 120

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnctgcc 180

ctttatttt tcatgaaaga aattgctgaa gaggactaaa agaagtttta gtaagcattc 240

aataaatgta tgttctttat agtttccaaa tcagcaaata tagacatcct gcatttttaa 300

ggagatttat atattttatt ggacatgctg taatttattt aaccacttcc ctgttggtag 360

acattatttc cattttcttc tgctagatta atgcttgaaa aaaatgtgtg cctcctaaag 420

actgtgatga aagttgcctc tgaataaaac tcaaacaaat cattaatcat taactctttc 480

cttacttgta tgctctttgg atgctctact gtgttatcta taaaataaag tttgaagtga 540

aaaattaggg taaaacattt tatatcattt ttaaaggata tatacatgga tgtacttaca 600

tatgcatgtt taaatttata taccataaca tttatttctt tttttaaaaa 650

FIG. 5A

tatatttgtt ttttttctta cattttatt tcaaaatcta aggacatctt ataacccaga 60

aatatttttt ataccttgtc atgtcttaga ggaaagagcc accccagtct tttttcattg 120

atgtttttct tctctcttcg tactccagag gtagatgaaa accagagggc cacaatgacc 180

atggtgatgc ctgaggtcat tctggggcac agacctcagc ctaggttact ccacttcgcc 240

tatctttaga tccaaaacta ccctgctgac tgctgagata aacaaaggag aataatcagg 300

ttggggaaag gatttctatg cgaagacatg tctccatgca gtcctcctac actgagcaga 360

gcatgagtca ggtgcttaga gcaggatttt gtcctaaacc aggaacttca gagttttctg 420

aagaatgtgg ctatgtaaag caccccccca ccccaccctt acttctcaag tacattacgt 480

ggcaagtctg aaaaaactta cacttctgtt gttaaatgtg ggggataaaa tataaactta 540

gtttcaagag gaagctatct tgggaggtaa tgcaaataat tcgttgtgtg tttcctgaat 600

aagtgacagg tgctgactac cattgatgct tcattgcaat aaaatgcaaa gctcccccaa 660

gaatttttga aatgcatcaa gctaggtgtt ctaatctagc aaaaggacct gcatacatga 720

atttttcatg cttttgccaa gtcttttgcc ctttagttta gttaagggcc ccacatgaat 780

ggaaagcctg tgttgtcagc ttaattttgt agttgtggaa accttccagt tttctccttt 840

gtctaatacc ttcaggagtt caatcctagg ttgaagctta atttaataac catgtggcat 900

gtaaagtaga aaacaaaaca tcttttcctt agcatacagc aaaaaaaaaa aaaaaactca 960

ctcatggatg tagtgtacac atgccagtgg atatatagtc ataactgcag tcattggtag 1020

cacagaaata aatgtgcatt gaagacacag agannnnnnn nnnnnnnnnn nnnnnnnnnn 1080

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 1140

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnngg 1200

gctagcccag tgtctgactt actgtgttta agaaatatca actattacgc tacttcccag 1260

tgacagtcca aatgcagacc agtgttataa ctctacnnnn nnnnnnnnnn nnnnnnnnnn 1320

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 1380

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn aggcaaggtg 1440

gtaaaagacg cttgcacgtg caaatgttac tttgtgtaac tnnnnnnnnn nnnnnnnnnn 1500

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 1560

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 1620

FIG. 5B

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnct tagtgaatct aatttgcagc 1680

tgggcttgag aaaaaacctc ttcatagaat tgtttgcatc agtgtcttga ttgcctctgt 1740

aacttacaat aagcaagaat gtttcaggat ttcaaaaatc tattgcattg cctaaacctc 1800

ttattttgta tggagtaatc aagctcaaag tttgcatgtc ttagaaactt tacttggggc 1860

aaaattagac caagtaacaa ttaatcttct aggtattctg agctattcag acatatgatt 1920

catgtttgct aattgctctt ttctcttgta aatattagct gaaaaatgtc acctgtctga 1980

caagtagcat attttatgcc tatcactcct ggcacgcatt cttacaaggc agacaggaaa 2040

aataggaaga aaatggactt ttatcaaagg cccaggcagt aaagagggga gttctgctgt 2100

aagctaaggg gagttccaga ggaagttata ggcgttccct ttcttatgac aagaaagcat 2160

agtgcagtaa ataaatttgc taaatagatt caacagtctc tacccaaagt catctattta 2220

attcttgttg ttatgcagac tcagcaacta accttccttg taagccccat tttcttccct 2280

gtttcctgtt tatcaaatgt aattaaacaa gagaagtatt atagaagagt aaaagtagta 2340

ggtaattctt gaacttggca tatgattact acatatttga tgaatagttg aatattattc 2400

ttcaaggaca gattggattt ggtatcaggt ggctctgcat taagttataa gggacttaat 2460

aactcaagta tttaaggacg gcttccatca taaagggatc tgcccttaag agggtcccat 2520

tatggagatt ctgaggtgag agctattcca agtgtgcagt ggattaaaat aaaagaatca 2580

tacaggaaat ctctttttac atgccttatt ccagggtctt tgcaacctgg cacagcaagt 2640

gcagatatga ttagcattgt tttacacatg tacactcacc ttatagccct gcccctgtgc 2700

ccctcctgca caaaagaatg ctgggcacac gtgaactcct ctctgtagaa aggcacatta 2760

atgttctagc catggttaaa acagggatag aggcaagcca aaaatgtcgg tcatttgaaa 2820

taaatctcaa gtttgtgcat atcactatca agtgtgctgt gtggcaatta agaatgccaa 2880

tttgtgtgat cacaggcaag ttgcagtttg atgaaaggaa agcagaggtg aatatataac 2940

cagggtcatc ctttctttct ccctctctct ctttctgtca tttatttgcc aagctcttaa 3000

ctagaacttg ctatgtgcta ggtactggat atatcaaagc aaactcagcc tggtctttgc 3060

cttcaaagat ttgcaggata gtgggaagaa aaacttgaat cagaggacat ctgcagtggg 3120

aatcattcaa gcagcagaaa acccaaaagt tacttatact gtgaaatctg atcagagaat 3180

ggactgtcct ggttagtaaa atatcctgga ggataaagat tggccatgca ttccacatat 3240

FIG. 5C

gaattaccac tttcccaaga attaaaacat ggtacgaaag aaaggnnnnn nnnnnnnnnn 3300

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 3360

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 3420

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 3480

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnna aacaacttct 3540

ggaatagcta atgcttagaa gcagctccca aatatttgtn nnnnnnnnnn nnnnnnnnnn 3600

nnnnnnnnnn nnnnnnnnnn gcaagctcta ctgaacataa tttgatctaa tcttctgtga 3660

ttattcagaa actacttcaa gattttccta tacctccatc ataatgaata cccattcatt 3720

aatgatggaa gcagcctaat tttgtcattt ttcacacttt attgatgtaa cactaccttt 3780

actagtttgg ccactcctta tgctttttt atagaactat ttagatcaat tcaactttta 3840

aaaaataaag ccacataccc ctgtggtaga tgaaaaacaa gtatcatttg cactggtaaa 3900

tagagaatag gaagaaaaat aaatgcagtg aaaataaagc agtgttatca aatcctaccc 3960

agatactgtt atctacccgg aagcttcctg tttgattaaa aggaaaaata gccagtgtta 4020

gaggtgtgga agtctagttg aaattatatg caattgaagg attaaaatag aattgaaaag 4080

ggaataaatt cctctctgaa taatttaact ccctttaggc tttgattctg cctcatctaa 4140

aatcatctta catacttcta gtggcgtgtc cctcacattt tggtaaactc tgnnnnnnnn 4200

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 4260

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 4320

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 4380

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnccat ttttcctttc cctttattgt 4440

cagaaaatag aaagcatcta cagtgggctt gtatgatgtg gtggttagaa atacctgatc 4500

tgattnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 4560

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 4620

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 4680

nnaccatcac tggtgagagg aagtgatacc tggcacaaaa atatatggat taatcaatat 4740

ggattgaggg aaacaaacct ggagaatagg atgtgaaggt atttaagtaa catgagctca 4800

gaccttgatg gtagggaagt cgaaaggaag cattttgttc ttatatgaca gatgacctgg 4860

FIG. 5D

```
aatgactgca gggcttgggg ggtcagggac tggaggtggg agaggcctct gagagcaagc 4920

agtgctgtcc accagaagct cttgctgggg tgcccagaga ggagcaaagg gcagtcagct 4980

gcacaggagg gaatgtttgg aggagagagc cacctcagat cagcgggtca agaatcccac 5040

tcttgcccag atggatgggg caaaggagaa aaaggattcg ccacgggaat gtccagataa 5100

gacaggtgcc ttttggaaaa tgggggtgag atgggtctca ggttacactt cgtaagaact 5160

ggaatgtaaa gtaaaggcag acaatgacaa aatatcttgt tttcttttca gct tta    5216
                                                        Ala Leu      20

ttc aca gtg aca gtc cct aag gaa ctg tac ata ata gag cat ggc agc    5264
Phe Thr Val Thr Val Pro Lys Glu Leu Tyr Ile Ile Glu His Gly Ser     36

aat gtg acc ctg gaa tgc aac ttt gac act gga agt cat gtg aac ctt    5312
Asn Val Thr Leu Glu Cys Asn Phe Asp Thr Gly Ser His Val Asn Leu     52

gga gca ata aca gcc agt ttg caa aag gtg gaa aat gat aca tcc cca    5360
Gly Ala Ile Thr Ala Ser Leu Gln Lys Val Glu Asn Asp Thr Ser Pro     68

cac cgt gaa aga gcc act ttg ctg gag gag cag ctg ccc cta ggg aag    5408
His Arg Glu Arg Ala Thr Leu Leu Glu Glu Gln Leu Pro Leu Gly Lys     84

gcc tcg ttc cac ata cct caa gtc caa gtg agg gac gaa gga cag tac    5456
Ala Ser Phe His Ile Pro Gln Val Gln Val Arg Asp Glu Gly Gln Tyr    100

caa tgc ata atc atc tat ggg gtc gcc tgg gac tac aag tac ctg act    5504
Gln Cys Ile Ile Ile Tyr Gly Val Ala Trp Asp Tyr Lys Tyr Leu Thr    116

ctg aaa gtc aaa ggtgagtggt gtcaaggact agaatccatg gaagctctct       5556
Leu Lys Val Lys                                                   120

ccaacagagg atctgcaagt cacagaaacc cattaaaggt agctcaagca aaaacaagca 5616

ggctgctttt aaggagacag ctatttcaga gaaaatgaaa gcatctgctc ggaaataatt 5676

tttgacatct gagtacaaag cagccgaagt acaagtgaaa gggggtagga cctataggaa 5736

taaaatggga ctggaggaag ccaggaaaat tagtccctga aatgtgggag ggtatgaaaa 5796

ataagctttg cctaattcac aattctccca tggaacatcc ctgacttgat tattaagata 5856

ctctttttca atagtttata ccctgaatcc agagttttta aaaccatggt ttgccgccca 5916

ttcatggatt aaaatatcaa tttagtgagt agcaaccaga tgcacgtttc ccgcccttta 5976

aaaaataatg tatagaagag aatagacaga gtagatcaga cgatatcaca gagtaggact 6036

gagtactgta aaactaattt ctgagggacg tgtgtgtgtg tgtgcgtgtt gggtcatggt 6096

ataaattttt tttttcttac tttggatcat aaaaagttac aagtttggaa aacactgctc 6156
```

FIG. 5E

aaatgcaagn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 6216

nnnnnnnaga gtcccatgaa gtctatagct gtccctattc ctctggattc agggatctct 6276

ccactccagc acaattgaaa atctaaatat aaagagaatc ttcacactct tgtttgttct 6336

agaaaaggtg atttgaggaa agacatataa caactataaa aaatagattt tgcttgttca 6396

ttggcttatg gtctccaggc ttgaatgctc tgagataaat gatgccaata tttctctggc 6456

ctcttcccat cccacgcatt ggacctcaga tggtctgtac tgtcttctag agggtttgtg 6516

ggttttggcc ccaaaaaacc attaaccttg gcagaaagtg tgtgacttta tgatctggta 6576

caaagaagga caaactagag ggactggaca tgaggatgaa tattgtgttc gcccttatnn 6636

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 6696

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 6756

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnaaa gaccctcagt 6816

tgttacaggg gcagtgacct cctcacacct caaccatcaa tgagtcacca ggaaagccat 6876

tagcctagat gtaactgttt tctatcttta ttgcatttcc tacatccagg cagcagctgg 6936

gaggaactct agaacactga agtttgtctg agttccctta atgtaaggct gtacattctc 6996

aggatgcctt gatgtactcg aatatctgca accctaaatc accacctctg tttttattga 7056

tctctatctg aatgctgtat taatgggcca ggccttctgc ccattctctc aaactgagaa 7116

ctgtctctca ttcctgggga ggcaccctgc ctactcctta cctagatcag ggatttctca 7176

gttgtggaga gatttgttcc ttatagtgtt ggtcatcaaa ctgggatatt tggggattac 7236

aaagactttt caagggatgt atgggcacag gcagttttag gaagtgagtt cctagatcct 7296

catcttcccc aaatactcgt tcccaaaatt gacgagcctg acaatgtgca tgccaggcaa 7356

ggctcttggg gttcccctaa aacacttcct cttttaagcc taccactcac tcatcatgaa 7416

tatagtccat tgtcccaggg tgtaaaaccc tctatagtgt taaataaaag aatgattggg 7476

aacattgaca cctgatggaa ctgttatgac taaaaaccct tttgcaaata atgtggtatc 7536

taattttctg ctttcaacaa aattgaagga ggcccttata aagttaataa ctgataatca 7596

aaaatgagta atttttgcca tgtaaatcag gtcaaagaat gaaatggcat tgctgtaacg 7656

aaactgcttc cattcccatt gatttactca tacgaacaag attccttagc ctttataagc 7716

tacaaaaaaa tgaaaaatag aaatagaatt gaggctgaat tctattatat aaaatcattc 7776

FIG. 5F

caaccatgtc atatggttct tcggattcat gaataatttg gaaaagagag ccatatccat 7836

cttattaagg gacacattcc caataaattt tcatctttca tgtttaataa ttatcaatat 7896

tcataacatt ttacattttg atcaaatatg tgttaataat aatagaaatn nnnnnnnnnn 7956

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 8016

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 8076

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 8136

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 8196

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 8256

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 8316

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnattag atcttaatgc agaacaccct 8376

gaacatttaa agcttcatag tcacaagaga aaagttttca tttcaatagc tataaatatt 8436

ttgttgttgt aaagacatat aacgataatc aatacaaaat ctgtcaaaca aaaatatgtt 8496

acattaagat aaaattctgt agggaaggtg aaattggaag tgagtttcaa tgaatgaaaa 8556

gaaacaattt agacagagaa gnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnncttagaa 8616

ggaattgaat agattaggtt ccttacccaa aaagcctctg ttatttgtct tatttattta 8676

ttctcttttt tccacattct ccagtctcat tccccttttt taacacagga aattattcca 8736

gcatgtttca tacatattct tttgtttgta agagcttatt taaaatatgt aatattgttt 8796

tagatgcata tatttttttt cttgtggaaa ctatattgta ctatatatat atattttaga 8856

aatggacaca ttannnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 8916

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 8976

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 9036

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 9096

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 9156

nnnnnnnnnn nnnnnnnnnn nnt 9179

FIG. 6A

```
tagatctcag ctttcttgag gcagggagcc atatctgttt aattcactca gcatatactg 60

caaagaagca gnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnta 120

gggagaagtg cagaataaat atacccaact ctttactatg tatagacatt atctaggtct 180

ttatttttt tctcttctta atctcaaaga aaacagagga aaggaggaag taaaaagtaa 240

atttttgcct gaagatgttt ggaaaaaata ccaaataaag tgagatagtg ggtaatctag 300

tgatttttat ttttccgtcc tctttctggc ctccaattgt gaaataattt atagcactgt 360

aagaaagaag ccacaaattg tggtagcttg gaccactgtt gaggnnnnnn nnnnnnnnnn 420

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 480

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 540

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 600

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn acttaatatt gatagtgata attttattca 660

tttcacatgg catgaagtac caagctctat aggaatcaga aaataaagtc ttatttcttt 720

ttcttctcta ttgtcca gct tcc tac agg aaa ata aac act cac atc cta    770
                  Ala Ser Tyr Arg Lys Ile Asn Thr His Ile Leu    131

aag gtt cca gaa aca gat gag gta gag ctc acc tgc cag gct aca ggt   818
Lys Val Pro Glu Thr Asp Glu Val Glu Leu Thr Cys Gln Ala Thr Gly   147

tat cct ctg gca gaa gta tcc tgg cca aac gtc agc gtt cct gcc aac   866
Tyr Pro Leu Ala Glu Val Ser Trp Pro Asn Val Ser Val Pro Ala Asn   163

acc agc cac tcc agg acc cct gaa ggc ctc tac cag gtc acc agt gtt   914
Thr Ser His Ser Arg Thr Pro Glu Gly Leu Tyr Gln Val Thr Ser Val   179

ctg cgc cta aag cca ccc cct ggc aga aac ttc agc tgt gtg ttc tgg   962
Leu Arg Leu Lys Pro Pro Pro Gly Arg Asn Phe Ser Cys Val Phe Trp   195

aat act cac gtg agg gaa ctt act ttg gcc agc att gac ctt caa agt   1010
Asn Thr His Val Arg Glu Leu Thr Leu Ala Ser Ile Asp Leu Gln Ser    211

aagagctgcc cccacttcct aggtctatca gttagggttc agacaagaaa cagatggcat 1070

actcgagtga tttgaggaga gtgtaataaa gggactgttt acaaaggtgt gatcaccatt 1130

tggagaaact acaaaggata gtgcagaaca ctggggcttc aatgttggga gggcaattac 1190

cactgttgga gaagttactg gaatcagaag ggagctgtag ggaaagcccc acttcccagg 1250

agctgtagcc acagaatagg gaagctgcca catgcagcga ctccaaaggg tggaaactgg 1310

atgaatgaat accccaactc attctcctcc caccctccaa tctcctgcta gcacctccca 1370
```

FIG. 6B

```
ttggctgaac ccagctagaa gtcagagaat acaagggtcc actgttgtat tccataaaag 1430

tcaacttctc agggctcaga gcaatattga catgtacaga atagatctgg agaggaaaca 1490

gaaaatatct agtacaatag ctaatcactg tgattcatgc acagtgtcat gagccagcag 1550

gatgaatatt cctttgctgt acttgctgcc agtcagctgg ttatgggttt ttccaagaaa 1610

tttggtctct aacaaaattc ttcagagcct ttactgacta tgctggatat ttttggaagg 1670

gatcccatac ttttgaactt catacagcag aatttcaaac aatcttggga aaataacaac 1730

ttttatctgc ccagtaagga caactaacac ctagtatcat aatcatttcg taagagacag 1790

gtaatttcat caccgagtgc atat                                        1814
```

FIG. 7A

ctactgagaa gggatatact ctcagactaa aggacagtcc ctagtactga ttcaatctgg 60

ctttatagaa aattcactat attgtcattg tatttcacag tttgcccttt gtcttagctg 120

gtaagacaga gcctatgata aggacttgtg tggcatgcag gtatttaatt ggcaacccca 180

gagggcagaa gcaagagatt taggagttta agagagggta atataagagt atattatcaa 240

agttgtagtg tggacaacag aaactcaaat attcaaggac cagcatgtag acagcctcct 300

aagatgtcta ctcagacaaa gaatttcagg tggaaggact tgttcatctg cttcacgccc 360

attggttgac aggaatatga actccattct gctgctgggc tagacatgca tgtgggctga 420

gtgagctttc cccagtatcc gtagcatcag aaaagtcgca gggcagaaag aaaagtatcc 480

aatttgaggt gaattactga ccttgaagtg agtgtaagcc taactagaat tctaccccag 540

ctggctgaag tgaaaggtga ggctgagagg aaataaggca ggactgcaca gtccccaatt 600

gtactgttca aatccactca tgcccttcat taagtcagct ctgccactga gccttccagc 660

tgggaggcag ccacaatctc tgcagaagat ttaatataca ccagtttgtg gaacaagctg 720

tnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 780

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 840

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 900

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 960

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 1020

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 1080

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 1140

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 1200

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 1260

nnnnnnnnnn nnnnnnnacc tgcagcactg ggatagccct ggtacagacg tagaacatgc 1320

ttgaggaggt tgtcaggagg aaatgagtta gaccttgcac agaactacca ccatcaagta 1380

cagttggggt gaggcagaca tggtatgagt tgaggcatca gagatatctg atgctttatg 1440

ccaaattaaa attaattttt tcatggagtg acactgatcc acagaccaga ctccaagaac 1500

tttgcagtga ctaaataccc atctcatcat aactttcctg gtattttctt ctggaaaaaa 1560

ttcttccctg atacagtttt cagaggcagc tagatgcact gtcatctctc ccctttccc 1620

FIG. 7B

acttccctac ctatccacaa tttactaccc aatgccaaca ctaaagttag cccaacttcc 1680
ttctaactaa attattagtt tagaaggaaa gagaggagtc atgctaagga tcttaactgn 1740
nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 1800
nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 1860
nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 1920
nnnnggggag aggaggggag aggaggtagg gaggggaaag aaagaaacta gaaatccatc 1980
aattttagga ccaacttcag gtaaaaaaat gaattaggca agttggtctt tcaacattct 2040
ctacctctct ttatatcatg gttgagacca cagacttctc acctcatgaa agatgaactc 2100
taactaattc atactaaagc taaagcctct aaagaggatt aaatatgagc aatcccacga 2160
gaactttttt cccctggaat tgtttattca actgtcgttc gttatatgga atttcctgcc 2220
tggttaagtg taggccagta ctttggatga attgtagttt tctagaaaga cgcttcttat 2280
ataagaacct ctccagggaa acaggggcct gtatgagatg aattgagaaa taactttaca 2340
ccactgatta tgtcagtgtt ctattctgca tggtagagat gtgaaagggc agactgacca 2400
ttgctctgga agcctttacg ctgtgagaag ttaacagtgg agtaaaatgg ccactccact 2460
ctcttcatgg aagccaacat ggcttactaa atagtcaaca accatgggag agacctgtgg 2520
ggtcttcatc agagctcagg atctcctagg gtatcactca taaatacagc catcagggag 2580
atggagaaat ctttgtgcag ccagaaattc tcaacctggt tttacccatc cttcccaact 2640
ttgtattcgt cctactgttt actgacatgg atcctctgct tcattaacca tcccttcctc 2700
accacatgct ctctgaactt ggctgcacct tttctacctc catgccttct ttgctcaggt 2760
ttttccacat aaatatcatt atttccctct ctactagctc caagcccacc ctctctctgg 2820
ggcagctcag tcactccagg gcacaagggg gtctttccct catcccacat tttgagacct 2880
actacctgga ccatttgttt gccttgtaac tatgcttgcc tttttaattg ctattttatt 2940
ttccatgtat tttcattgtt cacacaagtc ttctttattc cacactaagg caaaagcaga 3000
gtcctgtgtt cataataagt gctcaacaaa tgttgggttg attgggttgg agattccatc 3060
ttagataatc gcagtcccat catgccagct accagactgt gtggacagcc aggtcagagc 3120
agccaaatga tattctagct tgtggcacaa ataccagcaa caaaataacc aaagtcacac 3180
atctgcctct gagttcctgg cttctatttc tcaagggcat ttttaagttg tcttatgact 3240

FIG. 7C

gttccctttc tactcattct cataaattga gctgtggact gctgtgaccc acaagcttct 3300

ccggaagtca atgtataaaa caaacacgga aacgaagagt atggtgggtg gagggtactc 3360

cactgactct agaatggatg actgaacatt ccaaatttca agcacaagtt agggagcaac 3420

agatcatttt ccttttgaaa tagggtttct tctgctcagc cagttgttgt attttcatta 3480

ggaaatggaa tgggactaca gcacaaaaaa taaatataaa aggacccttg tagggctggc 3540

agaaaagaga atccttccta ggagacctgg aggtgattcc aggcnnnnnn nnnnnnnnnn 3600

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 3660

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 3720

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 3780

nnntcagaaa gtgtgcaaac agtaaaaaaa aatggtatat ctagcaagtt gcatgcctta 3840

cttgtgagtt catgaagttg tggcaaggat aagacaaata ttttttgcca ttgcatcatt 3900

atatcattgc taagagtatg ccattattnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 3960

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 4020

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 4080

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 4140

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 4200

nnnnnnnnnn nnnnnnnnnn nnnnttaatt aattaaatta aagaaacgac aaaagagtat 4260

gcaagaattt taaaacaact tagaggaata tgtatgagga tacaggctaa gctaccataa 4320

tgaagagacc tcgaaataca gtgagaagcg agacagaagt atctttcgtt ccatgtaaca 4380

ctcaggtggt tcagagcagc taagcagcta tgttccatag agtcattcag tgatccagat 4440

tattttcatc tgttgctctg ccattctcca ggatgttgtc cctataaaat tgtcaaagct 4500

cagtcagtgc caaacccatg tttcaacctt cagaaagtaa acgagtggtg gaaaacacat 4560

tcaatgtttt aaggccaaga ccttgaaaac tcactctctt agcctgaact tagattacat 4620

ggctgggccc acttaactat aggggaggct tggaaacata gtctctgaga agccatgtgt 4680

ccagctaatt ccctaatact aaagttgaaa gaaagaatgg attaaccagc agtataccac 4740

aaggtaacaa atgactagga ggatcaggct aggtggacta gaaaagagac agtcaattca 4800

gtgcaacaat tccatattga cacttttcat gtagctgttg cttggctcta tctagagagg 4860

FIG. 7D

```
actcagaggt agtttagata aggcctttgc cctccaaata cagtctaagc agactgattt 4920
cctactggat gttcaacttt ggagtcttca gggatgagta gggcttctgt acgtggaaga 4980
gactatgagg gaacctgcac aggacaaggg tttgcataaa gacactgagg tagggacctc 5040
tcctgttgtg gggacagtga gaggcccagg tctccttgac tcacaaagtg cttactaagc 5100
acttactaga aattaagaag cagattataa tcaatatggg ttatccaatg tttggatgag 5160
caaggctcct tatcttttct tcgttaatgt taatcacact cttttggatg gagacaaata 5220
tctgtggggg ctnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 5280
nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 5340
nnnnnnnnnn nnggctcaga ctaaataatg tctaatctct tctccagtaa aacaatccgt 5400
ggttctcaga tagcactgtg ctggaggtag tggggtttga gggctgggaa gttgggagga 5460
ctgagccctt cccgctgagc agtttcgtcc agtttttcct gtaccagcct gtcatgttta 5520
ttccatgtga atgactccag aggcaaaatt caagcttttg aatagggcac aaattaactt 5580
gagtaccctt tcatttccct gtaggtgaac actcctctag ccctgccttt tgtcagtctg 5640
gagcccttgt tctaatctgt acacaccaga ggactttaca aggctttccc cagcctccag 5700
aattattctt ctgatccacc ctctactaaa ctcacccttt cctcagtgct aggacgttga 5760
aaaaccgaaa caaggcaaag ggccaattgt aataattcac actaaggcat gagtgactag 5820
gtttagtata ttaacactac ctaggatatt ctatttcttc caaaaggatc ctgttaatcc 5880
ttgaaattta acaactaatg gtatagattc taagcactgt gagtacttgt cagtggggga 5940
aagacatttt tgggctgaga gactttgcca ctgnnnnnnn nnnnnnnnnn nnnnnnnnnn 6000
nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn aagaaagatg attagatnnn nnnnnnnnnn 6060
nnnnnnnnnn nnnaaaaaat aacatgagag nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 6120
nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 6180
nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 6240
nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 6300
nnnnnncaca gagctagccg tgttggctgt cacccactca tgtggccagc ctgttggtct 6360
acctcttagt tgccatgtaa caggattctg gtgcttttcc tttgcccagg t cag atg  6417
                                                      Gln Met   213
```

FIG. 7E

```
gaa ccc agg acc cat cca act tgg ctg ctt cac att ttc atc ccc tcc   6465
Glu Pro Arg Thr His Pro Thr Trp Leu Leu His Ile Phe Ile Pro Ser    229

tgc atc att gct ttc att ttc ata gcc aca gtg ata gcc cta aga aaa   6513
Cys Ile Ile Ala Phe Ile Phe Ile Ala Thr Val Ile Ala Leu Arg Lys    245

caa ctc tgt caa aag ctg tat tct tca aaa ggtaagtgag ttttattcat     6563
Gln Leu Cys Gln Lys Leu Tyr Ser Ser Lys                            255

ggtaacccaa tgcactgggt gtctgcagca tgagccactg ctttgcactg caggcctatg 6623

gcttgctgct ttcatgctaa acccactcag agcttatgaa ccactttgag cttgtcttga 6683

tgattatttt tccccagaag aaaatggctc tcatcgtcag tgagctgaac ttcttacact 6743

gagtttttta aagggaatgt tttgttctta tgtctgaaag agtttgtctt attctttgag 6803

ccaagagctt tcatcagcct catgagagtg atgttatttt ggcaatgcag agagctacgt 6863

gctccgattt tgctggtggg aggttgccag gatcctttct gaggattcct tccattttca 6923

cccctctttt ccccagtctg gatatgacct gggttaaacc caccccctct cccaggaatc 6983

tcaacctcac ggttgggtaa ggaaaggaga aaggtttgtg aggccatttg gggataagga 7043

aacagctggt tggtggtgca ttaacgtctt tcagcagctc ccttcgagtt tctccttagc 7103

ctgttgtatt cttaccaaca cactcctgtt ctgttgtacc agctgggaca gagcatgctg 7163

aagcctttca gccctgattt cattgcttca ttgttcatgt gtctgtcttt ggtttcctgg 7223

gtggagcctg cccacaaaac ccccagaatg tatgcaggcc tagctggtgc tttcctaaac 7283

ggctcccttg tctgcactca atgaacttct ccaaagatct atacatggcc tcatctatag 7343

aaagagaaat gacatgtgga aataattcag taggagtttg cagcagcact atctgaggac 7403

taggggaatt ttaagtggtt gttatcttac atttatactc ataacttcta tattttcatc 7463

tgccataaaa tattgtcatg ttctatttgt ccattgccct atgtgtgtat gtattcactt 7523

gggtgctgac cacaatattt ctaactgtag aatgcaagga attgttgcca aannnnnnnn 7583

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 7643

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnncttca tggtaaagga 7703

ggaggtatgt ccaacagaac ttcgactttt aaatagaacc acttcagaga gttgtgtcag 7763

gtgcacctca gttgtcttat cttctgccat tcttctttta cctctcacac ccatacctca 7823

gggttcaagg cctggggcct gaggactcct taataacttc agaaatgagc agctgagtgt 7883
```

FIG. 7F

tccgttccag ctgtctttgg gagaatggaa tggagtcaca ctcaaagata gagtggaaat 7943

aaatcctctc ctcatccttc accccaatct taagagtgag tgaggatatc agtagctccg 8003

agctgggagg taaagctcaa gttctaactg tgattaggag acctttctta caaataagaa 8063

ttaagtgaat aaatgtgcaa acaatttctt ttatattttt aatgaaccag agagaaatca 8123

tggttgccta tataaccctt gtctccaact cacttgcatt cagatctgct ttcttacatg 8183

tgtctgccat gcacacaaac ttgtgtgcca tggaaaaggg ttgagaactg ctggtgatgc 8243

agacagagct ttaaannnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 8303

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 8363

nnnnngcagc aagagaagga acattttaca gcttattggc cgaacttcac tgccgctagt 8423

gtggttcaac ttggactaca gagaaatctt cctaactggt ttccctgtat tcactcctgc 8483

tacctccaac ttggtctgtt ctcacttttt gctataatag gcttttaaaa atcataaatc 8543

taccatgtgt cctctgtcca gaccttctcc atggcttctt attgctcact ggatgaagtt 8603

ccaacgagcc caggatggtt tgactcatgt ctccagcttt aactgcatca ccatcacctt 8663

cattgtctaa agctctaacc acacaggatt ttctagtcct cagaggcatg gcagtctttc 8723

aattccgagt tttctcatac aatattgtct cttcttaaaa tatttttttct tgttgtccac 8783

ctgagttgga gtcatctttt aaatctcagc taagcttata cttcatcaag tctttcctaa 8843

ttctacctcc acgcaccaca cccattacat taaatcccct tattatatgt ttccatagca 8903

cctactttct tcttttcagt atactcagca cacaatcaca tgtctaggat ctgttttaat 8963

agcttggact accaattaaa ttgcatccct tttaattgtc cattgattcc tcaagtaccc 9023

acatgcccat cttagcaaga agttcagtgt ctccctctta tagcatgtac ttctccacct 9083

cccacaaact gccagaaagc ttacttagcc cacagggcca gtgctaggca gctaggttag 9143

tcctccagag ggccctggtt ttgagcagtt gctgtctact ccggccatgc agaatctctg 9203

gtccttccag atgtctccat ccactgtgca aaggtaacct tgctggttcc gatccccaca 9263

cagaccacag tgctacaaga ttacagttct tatggttccc caacacatgc tctgtcattg 9323

gtcccaaagc aggaccccta tgggttgatg aggtaggagg aggtccctgc cttagccaca 9383

gctgcacaca gccagcctct tcccttctag gccctcatgt tgagcctggg acgccagtcc 9443

taacttcctt ctcttcagtt cctcttaggg ccattggtat cctgaatttc ttagtccatt 9503

FIG. 7G

gcaaagttaa gtaaagaagc agcaggcttg gtcctttcc ttccagatgg cttcttagct 9563

cctgaacaga tttacccacc tatacctcag tgactagctc tgtgtactaa agtgtattgg 9623

gagggcagcc attattggtc cataaaaggt cctgcttacc attttcccct aagaggaacc 9683

attcaacagt ttggggctcg agggtgacct gctgggctct agagaagaag ctggcaactt 9743

ctgttgcaaa ataatgttaa attctgcttc atctgcttgt cttnnnnnnn nnnnnnnnnn 9803

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 9863

nnnnnnnnnn nnnnnnnnnn nntaaacatt gaacctacta tatgcaggtg agtatgctag 9923

atnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 9983

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 10043

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 10103

nnnnnnntgn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 10163

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 10223

nnnnnnnnnn nnnnnnnnga tttgaataca ggtctgtttg actccaaaac ttgtggccta 10283

tttgttgcaa aagtgcttaa tacaaattgg ttcagtcaat attattatct ttgaacaatg 10343

gaaggagaaa gtaagtttca atccaaaata attgagtgac ttatacattg acttgctgag 10403

ccaatggcaa agtcaagtta gaatccagca gaagtcacca gctacagaat ctagatcttt 10463

agaacatgtc ttcagatctt cagaacagtg tttcttaaac tctcttgtga aggaacagtt 10523

atcatcatag gctggtaaca gttcacctac cagcaccagc ccatgaacca gactctaagt 10583

ggcacagccc tagaagattg agccagaatt ttacagaggt ttaaagacca aatatgctgg 10643

tttatggtta cctgtggccc acagagaatg gcagcactaa cctcaggcat aaatgaggta 10703

cccactgaag ccaacattca agagcaattc ctatgggtta accattgggc tcctttcaaa 10763

tgcaaaccct catgaaagag actacagtgc tgaatagaga cctccaaatt ccaggccaag 10823

ctcaggatag tcatgaggga attactaaaa acctggtata tagggcaaaa gcagaattag 10883

gaatggactg atttcaggaa cccaggcaat ggcaggagtt gggcattaaa tcctaaaaga 10943

gaatcagagt gggagggaat atgtgaaatc agaggttaag aaaaaagtga aaacctnnnn 11003

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 11063

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 11123

FIG. 7H

```
nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 11183

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 11243

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 11303

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 11363

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 11423

nnnnnnnnnn nnnnnaaaaa attaaaagaa agatgtgaaa tcaaggaaac ttactggtga 11483

gcagcatccc attatgtgaa cttgtgcttc tgaaccagta acttgagtta ctttgagcca 11543

gtatcagtca cttatacctt agtgcaaaat taattgatca gacattctga cctggaccag 11603

ggaaggcagg cagaagtagc agtcaagact aaagcagaaa agggagagct aattctgcag 11663

ccagacattt cctggattga atacccaaat tagtccctca gcctttaagt gcctgagggc 11723

caggagtaga cagaggaatg gaaagtgtga gacttctttg ttcacactct ttgcctaggg 11783

gccagatttt gctttatgca ttaccatccg aagtcccagg ccacagtgaa catttgggct 11843

tcgctatgtg gatttattta gatttacttt ttgtcctgcc atattttaat ctataagcca 11903

aacagttttc tcattaatct tattccattt ctggaatttt tccttttca gac aca aca 11961
                                                    Asp Thr Thr  258

aaa aga cct gtc acc aca aca aag agg gaa gtg aac agt gct          12003
Lys Arg Pro Val Thr Thr Thr Lys Arg Glu Val Asn Ser Ala           272

gtgagtaagc atgatttta cttttctttc ttactttctt ttctctctca gcttgaattt 12063

taaagtaacc actgttctat taattcatgg aaggcaactg aatagttcca gcttatagaa 12123

tcttcctgtt tggtagcatt tcagcgaagc ctcgttctta gccccagaac aatcatgcca 12183

tcttttgctc ggtctatatt cctaagcact cctagatgat actgcactgg acctctggtc 12243

tcacatagtt agaaacagag ttaaaatcga acagcaaaga gaagatattc aactgcgatg 12303

caattgacaa tggatgtttt tgcaacaaac aatgattaag aagtacattg ttgtgggctc 12363

tgagtcaaga gtaatatggg aaaaacacaa gtctcttcat gaggttgaca ggtttggagc 12423

tggaatctgt ggaggaggaa ggatatgatc taggggtcag aagaagtggg ttactaaaat 12483

cattaagcct ggttggatga aaagcttaga ctcaggggaa gcagnnnnnn nnnnnnnnnn 12543

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 12603

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 12663
```

FIG. 7I

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 12723

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 12783

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 12843

nggcaccaag agatgagggg ggcagtcttg gccatatatt tggctgaagt aagtcaattt 12903

gtcattcctg catgagcctt tataaacaga agtaagtaac caactactat ttggtcattg 12963

gagttgtcca agaggccagg gttctgtcta atacctgttc atgcatgaac atgccaacct 13023

agattgcatg cagactacca gttttgggtt tttgtttagt tcagcaggat ttttctcagc 13083

tcactgcctc tcaaactttc agcaacaaaa ggacatctgt gatatcagaa tctaccactc 13143

taagtatttg gatgcaatag caatgaatat ctgagtaaat ctaggtgggg agtgggggca 13203

ccctgtagcc aaaatgattt aacaaaatca aaccaaaatt ttggaaatga tgccttggta 13263

caatgaagag actacttgag gtaggtttga cttatctaat atcttatttt ctttaccaat 13323

acctaatgag gaatttaaat atttctagat agctttggaa aggtccctta aagaggcacc 13383

agcataccac tgccagatct aatcccccca aacactgttt tcatcatcat catgtcatct 13443

cttgtctcta tagatcatat caaatccttc ccagagtttt tcaggccttt tgacaactag 13503

ccacatttca ctaagccaac tcatctacca ctcttcaaca aaacttttcc tcaagttgag 13563

ctgctccacc aacaccactg ccatgagctc attcccactt ctgtggcttt gctcatgttg 13623

gttatttttt tggagtgtcc tccctattcc ttcttacttg tcccaatccc aacttttggc 13683

atggtctact ttaagataca gtaatgagta actttannnn nnnnnnnnnn nnnnnnnnnn 13743

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 13803

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 13863

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 13923

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn ttttttaaaat ttaattcaan 13983

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 14043

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 14103

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 14163

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 14223

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nntacataca 14283

FIG. 7J

caacactctc ttgcttaatc tgtaagactc tctcccccac tcataccttt ttatttttcc 14343

tctgcattgt acacacaatc tataccactc ttaagcacat gattacagcg ttatttttctg 14403

gctgcttcta tgtgtctata ttttaggtcc acctggtcaa tataataaag tgggatatta 14463

gtgttaatgc aactatatgg tatttgatat ttgtctttct gtccgtttat caatgtttct 14523

tatagnnnnn nnnnnnnnnn nnnnnnnngg tgtctgattt tgaccaaatt tgactaaata 14583

cnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnngt tgagtctatc aactcaaaaa 14643

agaataacct acaacaataa caagtttcag aacatttttt aaattactga ttttatgagn 14703

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnngaat ccattgccta 14763

gaaattgcca tggttaagat tttaatattg ctcaggccca gacagctcag ggctttgaca 14823

ttcccacacc cattctctgc catcccagtt ctatctcatc ccaaaaccat ccattatgag 14883

gagagtgtac agctctaggc tgcccgggag ccatcccgca ctctcatttt gtgactcggc 14943

atcttgggag atggagtctt gggacttagc ctggacatgt cccttgcatg tacttcttac 15003

aagactttta ttcagatgaa tattttccct tccaacttaa gaagcacagg gcttgctggt 15063

tttgcttcac taaccagcaa ctgaagcaag acctgacttg tgaaaatgcc taatagagtt 15123

cagtattagc gctgtttcac catttcctgg atctcttgcc tttgtgcaca tgatagaatt 15183

gcacttctct gtgattaatt tgtagttaag tgtggtcatg taactcgctt tggtcaatta 15243

aatgtaagca taagtgatgc gtgttatttc tgggtagaag atgtaagagt tggcatatgc 15303

tttgccatat tttctttatc catctggcat ggtaaccagt aacattctag gtagtaattg 15363

ctccatcagt ctcagtctct gagtgactaa aattgacaga gtcccctgct gaccctcaat 15423

gtacatggaa catgaacaag aataagcttt tgtttttttat attgagattt tggagttgtt 15483

tgttcctaca gcattaccta gtttactcta atacaacatg gaaaaaactg gaacctataa 15543

taaatagacc ctacgttgcc atttaaactt ctagttctga ggaataataa tgtggggaaa 15603

tactttctat ataataaaaa aatagaaaat tgcaaaataa aaatatactt atgtatcatt 15663

catgtcctat taaaaatgtt atttatagac tcaccatatt cccttcctcc agaaaaatag 15723

aagtaaaaat atgaaaatgc ctgtaatcat gtttttggat tatggaatca agtattgctt 15783

tttacttta tgttttctga atttttgttg tacttcacta cattttgag tgccctgatg 15843

tattactttc aaaaagaaga agaatacttt ctgaagccat ttcaaccatc cccactcacc 15903

FIG. 7K

tctctagatc ccagtaacca aatacattat ataggactct tcatcagtcc ttatcaagtt 15963

taggaagggc gatgctatac cttctttaaa ggacacctac caatgtctta gttgcctttc 16023

aaagactcct agcacagcta aatgtgatgg atatgctcta aggatataag agctgaagtg 16083

acttgcataa ggtcatatca taacttactg ttagaaatgg agctagaact cagacccact 16143

gagtccttgt ctgtgacaca ctgccctttc catttgtgga agttgttctt gtatctaact 16203

ttatctgtgc tactatttgg gcctagccat tctccctctt atgcagacaa gcagataaac 16263

agtaaaactt taggagtgga ttatgatacc atagatatat atcatctatc ctttacaaaa 16323

tagttattac agtcatcaag ccttggttag agtttacaga ccatgtatcc tagctannnn 16383

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnntgaaaca 16443

gtagcagacc aaaagaagtc atgattccca gcatagtgct nnnnnnnnnn nnnnnnnnnn 16503

nnnnnnnnnn nnnnaaacct gtattaagtt tctgttattt gcaagaccct gtcagttagg 16563

ccatgtggga actagaagga tgaatttatc agtcatccaa gattcttaca attaagtatt 16623

accgataagg tactcaagaa acagttctca ttcacataat ttgggttaaa acaaaaagaa 16683

gccagctttc tatatacttt tggtccagtc tttacgtttt ttgttttgtt ttgtttgttt 16743

tcatgagtat cccgacttcc ttctaagaac ttccacctga gaactgacca cagcgtcagc 16803

attccacatg ggtgtgtttc ctttcccctt tcccatttca gtggtttcca atttcttttt 16863

cttttggcac tataaacctt tcgcaaagga aatattagac agaactccta catgtcaagc 16923

aaattaaaat agtggtgaaa ttagagtgga ggacataatc accctatcat ataggctatt 16983

tgtccatatc atatttgtcc ctacaaaggc ctctaaggnn nnnnnnnnnn nnnnnnnnnn 17043

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 17103

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 17163

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 17223

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 17283

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 17343

nnnnnnnnnn nnnnnnnnnn nnnctctaag ataccttgtg cttcttggaa catatttgga 17403

aaatcatgta gctctcaaat tatccctatg tcctgaagcc caccttacca tcaatcctca 17463

gaaataccca acccatgtca ggcaacttca cactttcttt cttcaggcag cacagttgtc 17523

FIG. 7L

tcagggaggg aggagagtgc tattagcaag aggagtcact aacagcttca ctcacctgtg 17583

cccatgaatt tttaatggtg tgaaaagtct gtgtattttt tatggttctc tatggctcat 17643

ataagaggga caaacaatac atgaaagttc agagatgggg acaaatatca ctttaagctg 17703

gggataatca gggaagaaga aagttttcat ggagaaggtg acttttgaat caggaagaaa 17763

tggaaacagc aaactcttct agatagagga gacactaaca ggaaaggcag agaggcagga 17823

aggtgtggga aagtgcacgt gaccccgttc agagagaaag ccaggtgtga gataaggggg 17883

aaagactgtt agggcatgta ttgtaaacca ctaattccag gcaaaagtta gattttactt 17943

actaagcaag agtgcttcag ttagatccta gcaggaaatg gagggtatgc ttagaagagg 18003

taactgaggc aagtttaatt tataaaggtg tgtgcagcat taagggaaac cagcaaggga 18063

tactgagcat gccaggatgc aagagcaggc agggaaggtg actattccta ggtctgaagg 18123

agaaagggga gggagcagtt cccagaaccc tagtaaaaat ggcaatgaga aaggtccatc 18183

tggcaggacc tatggtcttt aacagaggga caaagtcaac ccacaacttg tctgggaggt 18243

tgctgaggaa tagatacccc aacctctctc tcaacccact gcaacactct ttttccccta 18303

gactgagccc agtcaaagac agagggagga gcccagtgat gcagtctgca atgtcatcat 18363

cctggagcat gaatagagtg cagcagggtg aataatgagt ctgcaggaat taatagaaat 18423

atctgacaca atagggaact ataagaggtt ttgaatagga gaggcccctg aaatgtgctc 18483

caatattact gaactatgtg tggcccaaag aatggaagag gaacagctct tgcaataggt 18543

ctgaggagag aagctgaaga cttggactag ggcaatggta aaaactgtgg aaagaagttt 18603

taaatgaaaa gttttaaacc atgcggcttc cagctagatg aacttttta aaaaaattag 18663

ttcctcactc aaattttggg gaggttatat attttctaat cataaaaaat gatttttctt 18723

atttgtgggc ttttctcccc ag atc tga acctgtggtc ttgggagcca gggtgacctg 18781
Ile 273

atatgacatc taaagaagct tctggactct gaacaagaat tcggtggcct gcagagcttg 18841

ccatttgcac ttttcaaatg cctttggatg acccagcact ttaatctgaa acctgcaaca 18901

agactagcca acacctggcc atgaaacttg ccccttcact gatctggact cacctctgga 18961

gcctatggct ttaagcaagc actactgcac tttacagaat taccccactg gatcctggac 19021

ccacagaatt ccttcaggat ccttcttgct gccagactga aagcaaaagg aattatttcc 19081

FIG. 7M

```
cctcaagttt tctaagtgat ttccaaaagc agaggtgtgt ggaaatttcc agtaacagaa 19141

acagatgggt tgccaataga gttatttttt atctatagct tcctctgggt actagaagag 19201

gctattgaga ctatga                                                 19217
```

FIG. 8

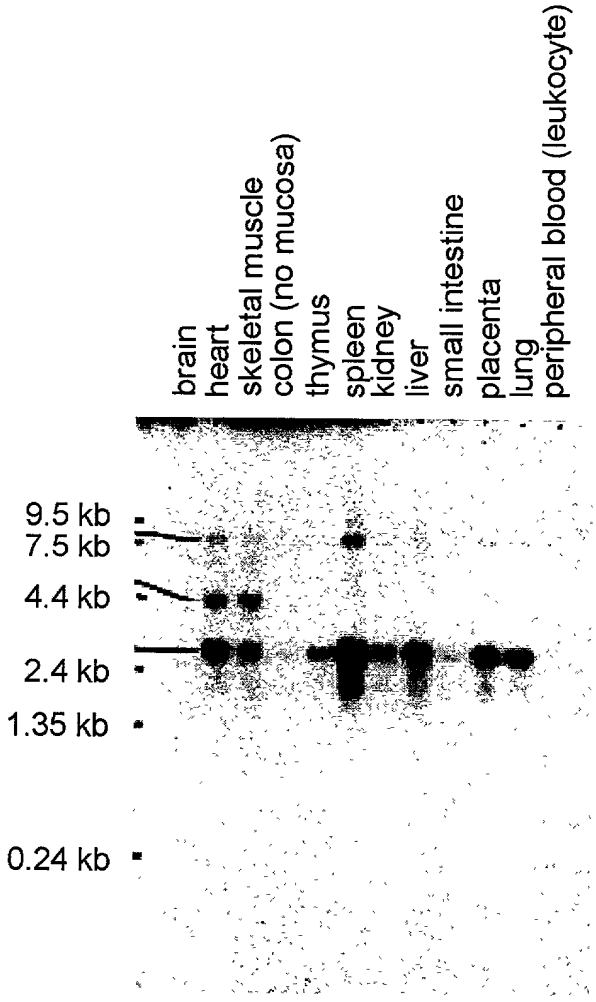

brain
heart
skeletal muscle
colon (no mucosa)
thymus
spleen
kidney
liver
small intestine
placenta
lung
peripheral blood (leukocyte)
9.5 kb
7.5 kb
4.4 kb
2.4 kb
1.35 kb
0.24 kb

FIG. 9

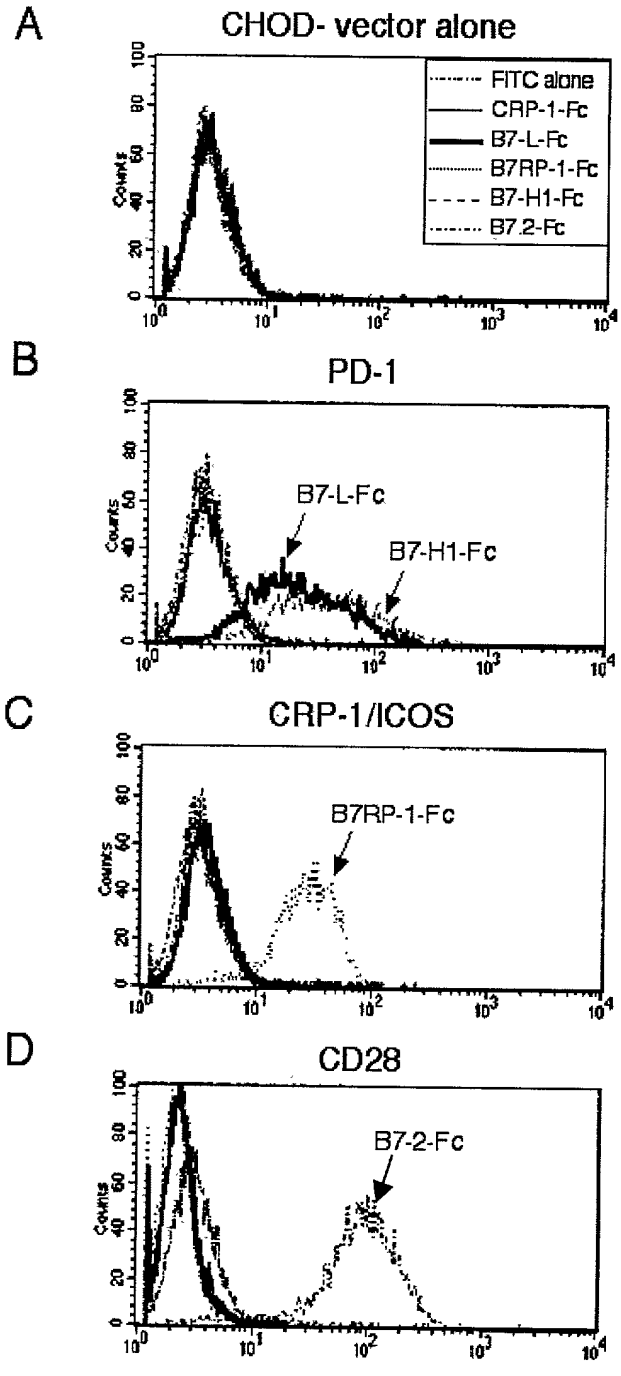

A
CHOD- vector alone
FITC alone
CRP-1-Fc
B7-L-Fc
B7RP-1-Fc
B7-H1-Fc
B7.2-Fc
Counts
B
PD-1
B7-L-Fc
B7-H1-Fc
C
CRP-1/ICOS
B7RP-1-Fc
D
CD28
B7-2-Fc

FIG. 10

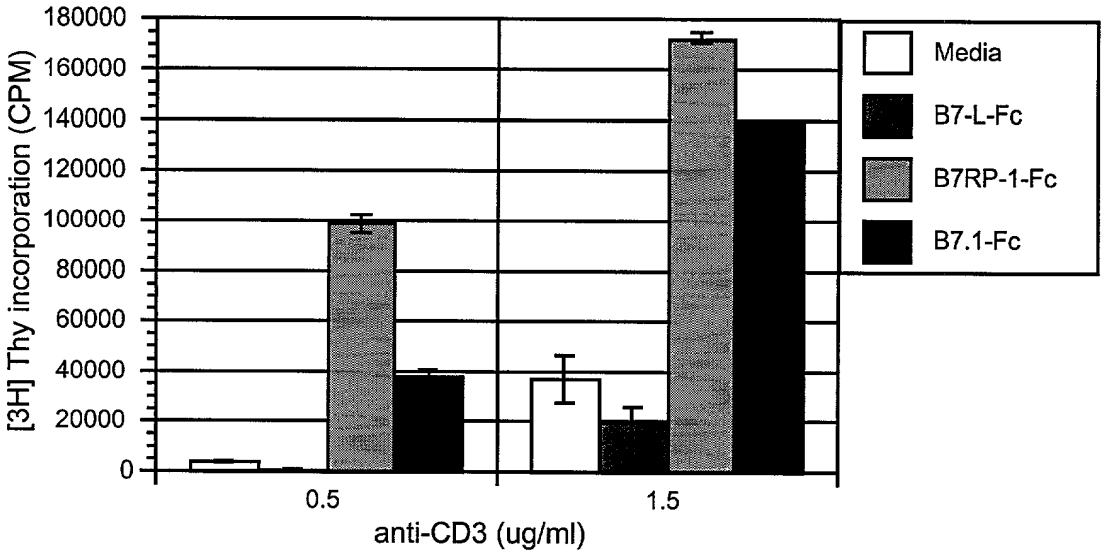
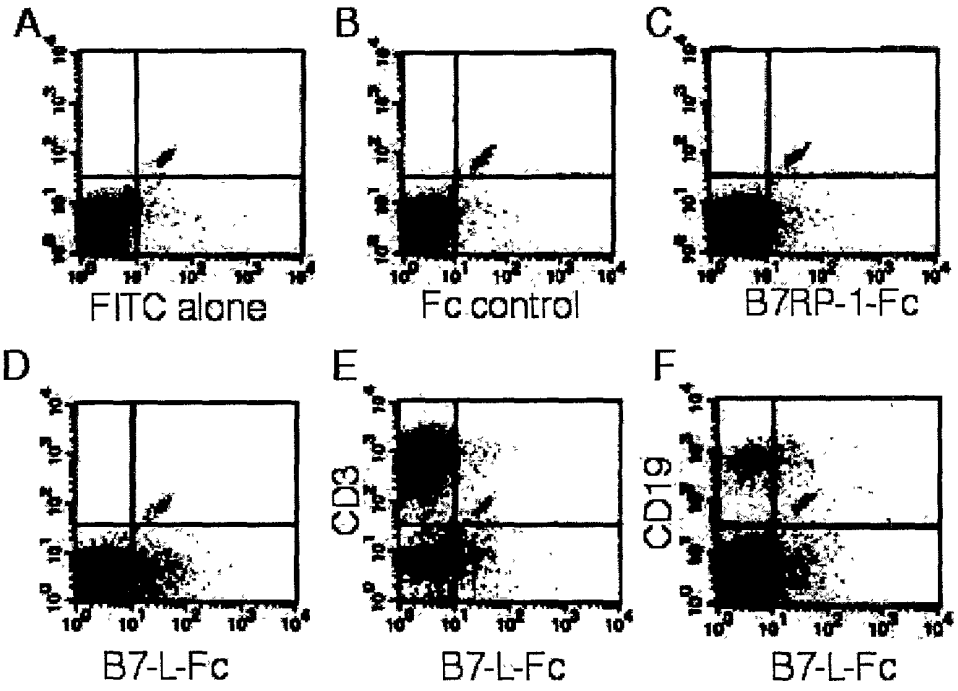

180000
160000
140000
120000
100000
80000
60000
40000
20000
0
[3H] Thy incorporation (CPM)
0.5
1.5
anti-CD3 (ug/ml)
Media
B7-L-Fc
B7RP-1-Fc
B7.1-Fc

FIG. 11


A
FITC alone
B
Fc control
C
B7RP-1-Fc
D
B7-L-Fc
E
CD3
B7-L-Fc
F
CD19
B7-L-Fc